

AMSAT News Service Weekly Bulletins

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AMSAT NEWS SERVICE

ANS-009

The AMSAT News Service bulletins are a free, weekly news and information service of AMSAT, The Radio Amateur Satellite Corporation. ANS publishes news related to Amateur Radio in Space including reports on the activities of a worldwide group of Amateur Radio operators who share an active interest in designing, building, launching and communicating through analog and digital Amateur Radio satellites.

The news feed on <http://www.amsat.org> publishes news of Amateur Radio in Space as soon as our volunteers can post it.

Please send any amateur satellite news or reports to: ans-editor [at] amsat.org

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<https://mailman.amsat.org/postorius/lists/ans.amsat.org/>

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ANS-009 AMSAT News Service Weekly Bulletins

To: All RADIO AMATEURS

From: Radio Amateur Satellite Corporation
712 H Street NE, Suite 1653
Washington, DC 20002

DATE 2022 Jan 09

The ARRL Foundation Grants an Award for the ARISS *STAR* Keith Pugh Memoriam Project

ARISS-USA is known for engaging students in STEAM (science, technology, engineering, arts, and mathematics) subjects by arranging live question-and-answer sessions via amateur radio (ham radio) between K-12 students and astronauts on the International Space Station (ISS). In the last two decades, over 1,400 contacts have connected more than one million youth using amateur radio, with millions more watching and learning. ARISS is constantly pursuing educational opportunities that inspire student interest and outcomes.

ARISS-USA is pleased to announce that the ARRL Foundation awarded funding for the first year of a two-year project called the "ARISS *STAR* Keith Pugh Memoriam Project" with *STAR* being the acronym for Space Telerobotics using Amateur Radio. The ARRL Foundation very generously provided \$47,533. The project honors the memory of highly-respected Keith Pugh, whose call

sign was W5IU (Silent Key, May 2019). He was an expert supporter of ARISS for many years, a star ARISS Technical Mentor assisting schools with their ARISS contacts, finding educators who might be interested in learning about ARISS, and going to schools to lead youth in a variety of lessons about wireless radio technology.

ARISS *STAR* (short for ARISS *STAR* Keith Pugh Memoriam Project), is a brand-new education program that will enable US junior high and high school education groups to remotely control robots through digital APRS (Automatic Packet Reporting System) commands using amateur radio. Year 1 focuses on systems development and initial validation of *ARISS* STAR, and Year 2 focuses on evaluation and final validation. Systems development and evaluation will be led by university staff and students who will undertake hands-on-wireless and telerobotics lesson development, learn about Amateur Radio, and support the development of the *STAR* engineering hardware and software. Next, youth teams will be selected to experiment and critique *STAR* telerobotics scenarios along closed courses and radio lessons. Some participating students will want to prepare for, and earn, their amateur radio licenses, using ham radio to learn and practice concepts in radio technology and radio communications.

Overarching goals for *STAR* are to improve and sustain ARISS STEAM educational outcomes with youth. Robotics is gaining popularity among youth and adults alike. Telerobotics adds a wireless accent to robotic control. *STAR*, therefore, gives ARISS a new educational dimension to attract the attention of more education groups and their students and educators—outreach that promises to attract new audiences.

The ARRL Foundation was established in 1973 by ARRL, The National Association for Amateur Radio ®, and advances the art, science and societal benefits of the Amateur Radio Service by awarding financial grants and scholarships to individuals and organizations in support of their charitable, educational and scientific efforts. ARISS-USA Executive Director Frank Bauer, KA3HDO, praised the ARRL Foundation, saying, "ARISS team member, Keith Pugh, W5IU, poured his energy into inspiring, engaging and educating youth in space and in amateur radio endeavors. What a better way to honor Keith than through the ARISS *STAR* initiative. We thank the ARRL Foundation for their vision to move this initiative forward. Maybe someday one of our ARISS *STAR* students will use their telerobotics skills to control scientific rovers on the Moon or Mars!"

[ANS thanks ARISS for the above information]

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The 2022 AMSAT President's Club coins have arrived!

To commemorate the 50th anniversary of its launch on October 15, 1972, this year's coin features an image of AMSAT-OSCAR 6.

Join the AMSAT President's Club today and help Keep Amateur Radio in Space!

<https://www.amsat.org/join-the-amsat-presidents-club/>

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EASAT-2 and Hades Satellites with FM Repeaters Scheduled for Launch on January 13th

I just wanted to confirm with you all that the launch of EASAT-2 and Hades satellites is scheduled for this January, 13, 15.25 UTC on SpaceX TR-3 flight, as it has been confirmed to us by Alba Orbital.

As it has been noted in older posts, both satellites offer voice communications in FM and data retransmission in FSK or AFSK up to 2400 bps, such as AX.25 or APRS frames. They also transmit voice beacons in FM with the call signs AM5SAT and AM6SAT, as well as CW, and, in the case of Hades,

SSTV live images too.

We thank you in advance for trying to receive their signals and of course for trying to use the repeater. EASAT-2 one will be automatically active 30 minutes after the launch although it would be a priority for us trying to have some telemetry frames first to check if all is working properly.

I tell you a bit more about the satellites:

EASAT-2 has been designed and built jointly by AMSAT-EA and students from the European University of Degrees in Aerospace Engineering in Aircraft and in Telecommunication Systems Engineering, with contributions from ICAI in the communications part, and it incorporates as an experimental load a basalt material from Lanzarote, similar to lunar basalts, provided by the CSIC research group on meteorites and planetary geosciences at the Institute of Geosciences, IGEO (CSIC-UCM) and that could be used as a construction material on the Moon. This project was promoted and has the collaboration of the ETSI CCP (UPM).

The UNESCO world geopark of Lanzarote and the Chinijo archipelago has been used for different investigations as an analogue of the Moon and Mars, also including the training of ESA astronauts. The selected basalt material meets the requirements to be used as a simulant of the existing basalt on the Moon. The purpose of the experiment is to determine its evolution in space based on periodic measurements of some of its properties. Although the experiment is limited and constitutes the first phase of this type of study, it represents an important milestone as it is the first of its kind to be introduced on such a small satellite.

As for Hades, its payload consists of a miniature camera module that outputs the captured images as an audio signal in SSTV mode. The SSTV formats it uses are compatible with Robot36, Robot72, MP73 and MP115. The design of the cam module is based on the one used in the successful mission of the PSAT2 satellite, an amateur radio satellite of the United States Naval Academy and the Brno University of Technology. This camera has been operational since June 25, 2019: (<http://www.aprs.org/psat2.html>).

The camera chip is the Omnivision OV2640, which provides a resolution of up to 2M pixels and compressed JPEG output. The resolution is limited by the internal memory of the CPU (MCU) that controls the camera to 320x240 (typical) or 640x480 maximum. The MCU selected for the control is the STM32F446RET6, which has the smallest possible footprint with connection to a DCMI peripheral, necessary for the connection with the camera. Images can be stored in 2MB serial flash memory. The complete SSTV encoder has managed to be implemented on a 4 layer PCB with dimensions of only 38x38mm. The MCU can be fully controlled from ground stations. The firmware allows the sending of live camera images, images previously saved in flash memory, or images encoded in ROM. It also provides PSK telemetry and imaging advance scheduling with current status (event counters, temperature, voltage, light conditions, etc.) and a brief summary.

The described module has been developed and manufactured in the Department of Radioelectronics of the Brno University of Technology in the Czech Republic. Both hardware and firmware designs with the source codes will be available on Github under the MIT license (<https://github.com/alpov/SatCam>).

As noted, initially only the EASAT-2 repeater is active. Hades one will be activated by remote control a few days after launch.

The frequencies coordinated with IARU for both satellites are as follows:

EASAT-2

145.875 MHz uplink, Modes: FM voice (no subtone) and FSK 50 bps, AFSK,

AX.25, APRS 1200/2400 bps
436.666 MHz downlink, Modes: FM voice, CW, FSK 50 bps, FM voice beacon with
AMSAT callsign

HADES

145.925 MHz uplink, Modes: FM voice (no subtone) and FSK 50 bps, AFSK,
AX.25, APRS 1200/2400 bps
436.888 MHz downlink, Modes: FM voice, CW FSK 50 bps, SSTV Robot 36, FM
voice beacon with callsign AM6SAT

The description of the transmissions can be found in the following document.

<https://www.amsat-ea.org/app/download/12530621/AMSAT+EA+-+EASAT-2+and+HADES+Transmissions+description+v1.05.pdf>

AMSAT-EA appreciates the receipt of telemetry, voice beacons and SSTV
images. A paper QSL will be sent to those who submit their transmissions.
It can be done through the following link:

<http://data.amsat-ea.org>

[ANS thanks Felix Paez, AMSAT-EA Mission Manager, for the above information]

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Need new satellite antennas? Purchase Arrows, Alaskan Arrows,
and M2 LEO-Packs from the AMSAT Store. When you purchase through
AMSAT, a portion of the proceeds goes towards
Keeping Amateur Radio in Space.
<https://amsat.org/product-category/hardware/>

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Changes to AMSAT TLE Distribution for January 6, 2022

CAMSAT XW-3(CAS-9) is designated Hope-OSCAR 113, HO-113:

HO-113 - Cat ID 50446 (Formerly known as XW-3 (CAS-9))

Drew Glasbrenner, AMSAT VP Operations / OSCAR Number Administrator,
announced the following OSCAR assignment in AMSAT News Service Bulletin
ANS-002 dated January 2, 2022:

"At the request of CAMSAT and the XW-3 (CAS-9) team, AMSAT hereby
designates XW-3 (CAS-9) as Hope-OSCAR 113 (HO-113). We congratulate the
owners and operators of HO-113, thank them for their contribution to the
amateur satellite community, and wish them continued success on this and
future projects."

Also thanks to Joe Fitzgerald, KM1P, for his timely name changing of
CAMSAT's new satellite to HO-113 in last week's AMSAT NA webpage TLE
distribution of Object Cat ID 50446.

[ANS thanks Ray Hoad, WA5QGD, AMSAT Orbital Elements Manager for the above
information]

ARISS News

No scheduled contacts reported.

The next mode change to voice cross band repeater is expected to occur in

early January, 2022.

The latest information on the operation mode can be found at
<https://www.ariss.org/current-status-of-iss-stations.html>

The latest list of frequencies in use can be found at
<https://www.ariss.org/contact-the-iss.html>

[ANS thanks Charlie Sufana, AJ9N, one of the ARISS operation team mentors,
 for the above information]

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AMSAT, along with our ARISS partners, is developing an Amateur
 Radio package, including two-way communication capability, to
 be carried on-board Gateway in lunar orbit.

Support AMSAT's projects today at <https://www.amsat.org/donate/>

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Upcoming Satellite Operations

Events:

4A90, MEXICO (Special Event). Members of the Federacion Mexicana de Radio
 Experimentadores (FMRE)[Mexican Society]are celebrating their 90th
 anniversary during January, February and March 2022 promoting each of the

31 States and Mexico City with the following 32 different special event
 callsigns and 4A90FMRE:

January 1st-15th: 4A90COL, 4A90CMX, 4A90EMX, 4A90GT0, 4A90HG0, 4A90JAL and
 4A90MIC

January 16-30th: 4A90MOR, 4A90NAY, 4A90PUE, 4A90QRO, 4A90TLX and 4A90VER

January 31st-February 14th: 4A90AGS, 4A90BAC, 4A90BCS, 4A90COA, 4A90CHH and
 4A90DGO

February 15th-March 1st: 4A90NLE, 4A90SLP, 4A90SIN, 4A90SON, 4A90TAM

March 2nd-16th: 4A90CAM, 4A90CHI, 4A90GRO, 4A90OAX, 4A90QUI, 4A90TAB and
 4A90YUC

Activity will be on various HF bands using CW, SSB, RTTY, FT8/FT4 and the
 satellites. Awards are available (see QRZ.com for details). For more
 details on the event, see: <http://fmre90.puebladx.org>

[ANS thanks Paul Overn, KE0PBR, AMSAT rover page manager, for the above
 information]

Hamfests, Conventions, Maker Faires, and Other Events

AMSAT Ambassadors provide presentations, demonstrate communicating through
 amateur satellites, and host information tables at club meetings, hamfests,
 conventions, maker faires, and other events.

Events with a confirmed AMSAT presence:

HamCation 2022 - The ARRL National Convention

Friday, February 11th, 2022 to Sunday, February 13, 2022

Central Florida Fairgrounds and Expo Park
 4603 West Colonial Drive

Orlando, Florida 32808

<https://www.hamcation.com/>

Hamvention 2022

Friday May 20, 2022 to Sunday May 22, 2022

Greene County Fairgrounds and Expo Center

210 Fairground Road

Xenia, Ohio 45385

<https://hamvention.org/>

2022 Rocky Mountain ARRL Division Convention

Friday, October 7th, 2022 to Sunday, October 9th, 2022

Event Center at Archer

3921 Archer Pkwy

Cheyenne, Wyoming 82007

<https://wyhamcon.org/site>

Clint Bradford, K6LCS reports:

Part of the "job description" for volunteer AMSAT Ambassadors is to "spread the gospel" of working satellites to clubs and conventions.

PS 2022 is starting off with a bang! Presentations set for clubs in ...

Tennessee

South Bay CA

New York

British Columbia

Ontario Canada

Victoria BC

Sonoma CA

Tampa FL

Texas

Nevada

Think a 90-minute lively, informative, and fun "How to Work the Easy Satellites" Zoom presentation would be appropriate for your convention or club? Always included are overviews of the ARRL, AMSAT, and ARISS. And pre-presentation questions are solicited and welcome.

Send an email or call!

Clint Bradford K6LCS

AMSAT Ambassador, ARRL instructor

<http://www.work-sat.com>

909-999-SATS (7287)

[ANS thanks Paul Overn, KE0PBR, AMSAT Events page manager, and Clint Bradford, K6LCS, for the above information]

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Want to fly the colors on your own grid expedition?

Get your AMSAT car flag and other neat stuff
from our Zazzle store!

25% of the purchase price of each product goes

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+ A new distance record has been claimed on A0-109. ES4RM in K049al completed a SSB QSO with F4DXV in JN04iu on 22-Dec-2021 at 15:24 UTC - a distance of 2,445 km. With a reported total power output of 8 mW, SSB QSOs over a decent range are quite a challenge. Can anyone do better?

+ John Brier, KG4AKV, has posted a video regarding H0-113 and some of the issues with working it successfully. The video can be found at https://youtu.be/Ngl0_WJ2hhc

+ Abstract Submission for the 2022 CubeSat Developer's Workshop is still open! The deadline is January 14th, 2022! More information about the 2022 CubeSat Developer's Workshop, to be held at Cal Poly on April 26-28, 2022, can be found at <https://www.cubesatdw.org/>

+ Version 1.11 of the H0-113 (XW-3) User's Manual, mainly adding the test mode telemetry data format. is now available at [https://www.amsat.org/wordpress/wp-content/uploads/2022/01/XW-3 Manual 1.11.pdf](https://www.amsat.org/wordpress/wp-content/uploads/2022/01/XW-3%20Manual%201.11.pdf)

In addition to regular membership, AMSAT offers membership to:

- Contact info [at] amsat.org for additional membership information.

This week's ANS Editor,

Recovered from 1 archived source message; see reconstruction provenance